

WHAT IS CLAIMED IS:

- 1 1. A seal assembly for a gate valve, the valve including a valve engaging member and a
2 valve body, the valve body having a first pocket, the seal assembly comprising:
3 a first pocket insert disposed within the valve body first pocket, the first pocket insert
4 being annular and having an L-shaped cross-section;
5 a first seat member disposed telescopingly within the first pocket insert, the first seat
6 member being adjacent the valve engaging member;
7 a first annular groove disposed at an exterior corner of the L-shaped cross-section of the
8 first pocket insert; and
9 a first radial seal ring disposed within the first annular groove of the first pocket insert
10 adjacent the valve body first pocket, wherein the first radial seal ring provides a radial seal
11 between the first pocket insert and the valve body first pocket.

1 2. The seal assembly according to Claim 1, wherein the valve body comprises a second
2 pocket, further comprising:
3 a second pocket insert disposed within the valve body second pocket, the second pocket
4 insert being annular and having an L-shaped cross-section;
5 a second seat member disposed telescopingly within the second pocket insert, the second
6 seat member being adjacent the valve engaging member;
7 a second annular groove disposed at an exterior corner of the L-shaped cross-section of
8 the second pocket insert; and
9 a second radial seal ring disposed within the second annular groove of the second pocket
10 insert adjacent the valve body second pocket, wherein the second radial seal ring provides a
11 radial seal between the second pocket insert and the valve body second pocket.

1 3. The seal assembly according to Claim 2, wherein the first radial seal ring retains the first
2 pocket insert within the valve body first pocket, and wherein the second radial seal ring retains
3 the second pocket insert within the valve body second pocket.

1 4. The seal assembly according to Claim 2, wherein the first radial seal ring and the second
2 radial seal ring comprise U-shaped seal rings, wherein the open end of the U-shaped seal rings
3 face the valve engaging member.

1 5. The seal assembly according to Claim 4, wherein the first radial seal ring and the second
2 radial seal ring comprise carbon-filled polytetrafluoroethylene (PTFE), polyetheretherketone
3 (PEEK), polyethersulfone (PES), metal, or combinations thereof.

1 6. The seal assembly according to Claim 4, further comprising a support ring disposed
2 within each of the U-shaped first and second radial seal rings.

1 7. The valve sealing assembly according to Claim 6, wherein the support rings comprise
2 polyphenol sulfide and are continuous.

1 8. The seal assembly according to Claim 1, wherein the L-shaped first pocket insert
2 comprises a bottom surface and the first seat member comprises a bottom surface, further
3 comprising:

4 a third annular groove disposed within the bottom surface of the L-shaped first pocket
5 insert;

6 a first seal ring disposed within the third annular groove between the valve body first
7 pocket and the first pocket insert;

8 a fourth annular groove disposed within the bottom surface of the first seat member; and

9 a second seal ring disposed within the fourth annular groove between the first pocket
10 insert and the first seat member.

1 9. The seal assembly according to Claim 8, wherein the first seal ring comprises a U-shaped
2 seal ring, wherein the open end of the U-shaped seal ring faces towards a bore of the valve body,
3 and wherein the second seal ring comprises a C-shaped ring, wherein the open end of the C-
4 shaped ring faces away from the bore of the valve body.

1 10. The seal assembly according to Claim 1, wherein the first seat member comprises a side
2 surface, further comprising:
3 a fifth annular groove disposed in the side surface of the first seat member; and
4 a retaining ring disposed within the fifth annular groove between the first seat member
5 and the first pocket insert.

1 11. The seal assembly according to Claim 1, further comprising:
2 a built-in lip disposed on one of the first seat member or the first pocket insert; and
3 a lip-accommodating groove on one of the first pocket insert or the first seat member.

1 12. The seal assembly according to Claim 1, further comprising a back-up seal ring disposed
2 between the valve body first pocket and the first radial seal ring.

13. A seal assembly for a gate valve, the valve including a valve engaging member and a valve body, the valve body having a first pocket and a second pocket, the seal assembly comprising:

a first pocket insert disposed within the valve body first pocket, the first pocket insert being annular and having an L-shaped cross-section and a bottom surface;

a first seat member disposed telescopingly within the first pocket insert, the first seat member being adjacent the valve engaging member and having a bottom surface;

a first annular groove disposed at an exterior corner of the L-shaped cross-section of the first pocket insert;

a first radial seal ring disposed within the first annular groove of the first pocket insert adjacent the valve body first pocket, wherein the first radial seal ring provides a radial seal between the first pocket insert and the valve body first pocket;

a second pocket insert disposed within the valve body second pocket, the second pocket insert being annular and having an L-shaped cross-section and a bottom surface;

a second seat member disposed telescopingly within the second pocket insert, the second seat member being adjacent the valve engaging member and having a bottom surface;

a second annular groove disposed at an exterior corner of the L-shaped cross-section of the second pocket insert;

a second radial seal ring disposed within the second annular groove of the second pocket insert adjacent the valve body second pocket, wherein the second radial seal ring provides a radial seal between the second pocket insert and the valve body second pocket;

a third annular groove disposed within the bottom surface of the L-shaped first pocket insert;

24 a first seal ring disposed within the third annular groove between the valve body first
25 pocket and the first pocket insert;
26 a fourth annular groove disposed within the bottom surface of the first seat member;
27 a second seal ring disposed within the fourth annular groove between the first pocket
28 insert and the first seat member;
29 a fifth annular groove disposed within the bottom surface of the L-shaped second pocket
30 insert;
31 a third seal ring disposed within the fifth annular groove between the valve body second
32 pocket and the second pocket insert;
33 a sixth annular groove disposed within the bottom surface of the second seat member;
34 and
35 a fourth seal ring disposed within the sixth annular groove between the second pocket
36 insert and the second seat member.

1 14. The seal assembly according to Claim 13, wherein the first radial seal ring retains the first
2 pocket insert within the valve body first pocket, and wherein the second radial seal ring retains
3 the second pocket insert within the valve body second pocket.

1 15. The seal assembly according to Claim 13, wherein the first radial seal ring and the second
2 radial seal ring comprise U-shaped seal rings, wherein the open end of the U-shaped seal rings
3 face the valve engaging member.

1 16. The seal assembly according to Claim 15, wherein the first radial seal ring and the second
2 radial seal ring comprise carbon-filled polytetrafluoroethylene (PTFE), polyetheretherketone
3 (PEEK), polyethersulfone (PES), metal, or combinations thereof.

1 17. The seal assembly according to Claim 15, further comprising a support ring disposed
2 within each of the U-shaped first and second radial seal rings.

1 18. The valve sealing assembly according to Claim 17, wherein the support rings comprise
2 polyphenol sulfide and are continuous.

1 19. The seal assembly according to Claim 13, wherein the first seal ring and the third seal
2 ring comprise U-shaped seal rings, wherein the open end of the U-shaped seal rings face towards
3 a bore of the valve body, and wherein the second seal ring and the fourth seal ring comprise C-
4 shaped rings, wherein the open end of the C-shaped rings face away from the bore of the valve
5 body.

1 20. The seal assembly according to Claim 19, further comprising a support ring disposed
2 within each of the U-shaped first seal ring and third seal ring, wherein the support rings have a
3 slit therein.

1 21. The seal assembly according to Claim 13, further comprising a first back-up seal ring
2 disposed between the valve body first pocket and the first radial seal ring, and a second back-up
3 seal ring disposed between the valve body second pocket and the second radial seal ring.

1 22. The seal assembly according to Claim 13, wherein the first seat member and the second
2 seat member each comprise a side surface, further comprising:

3 a seventh annular groove disposed in the side surface of the first seat member;

4 a first retaining ring disposed within the seventh annular groove between the first seat
5 member and the first pocket insert;

6 an eighth annular groove disposed in the side surface of the second seat member; and

7 a second retaining ring disposed within the eighth annular groove between the second
8 seat member and the second pocket insert.

1 23. The seal assembly according to Claim 13, further comprising:

2 a first built-in lip disposed on one of the first seat member or the first pocket insert;

3 a first lip-accommodating groove on one of the first pocket insert or the first seat
4 member;

5 a second built-in lip disposed on one of the second seat member or the second pocket
6 insert; and

7 a second lip-accommodating groove on one of the second pocket insert or the second seat
8 member.

1 24. A method of sealing a valve engaging member to a valve body about a borehole, the
2 valve body having a pocket on either side of the valve engaging member, the method
3 comprising:
4 providing a pocket insert having a substantially L-shaped cross-section within each valve
5 body pocket;
6 providing a seat member disposed within each pocket insert coupled concentrically to
7 each pocket insert around the valve borehole, the seat member sealingly coupled to the valve
8 engaging member;
9 coupling a radial seal ring between each pocket insert and valve body pocket at the
10 exterior corner of the L-shaped cross-section of each pocket insert;
11 coupling a first seal ring between each pocket insert and the valve body pocket proximate
12 the bore; and
13 coupling a second seal ring between each pocket insert and seating member.

1 25. The method according to Claim 24, wherein coupling each radial seal ring comprises
2 coupling a U-shaped seal ring with the open end of the U-shaped seal ring facing the valve
3 engaging member, wherein coupling each first seal ring comprises coupling a U-shaped seal ring
4 with the open end of the U-shaped seal ring facing the borehole, and wherein coupling each
5 second seal ring comprises coupling a C-shaped seal ring with the open end of the C-shaped seal
6 ring being positioned away from the borehole.